AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A microfluidic device, comprising:

a substrate;

a ~~microfluidic~~ fluid processing pathway formed in or on the substrate and including a ~~material loading~~ pathway end comprising a loading chamber; and

a separation chamber formed in or on the substrate and in fluid communication with the pathway end, the separation chamber comprising a first input opening, a second input opening, an output opening, and a material separation region disposed between the second input opening and the output opening, and wherein the material separation region is disposed along the fluid processing pathway further from the ~~material loading~~ pathway end of the ~~microfluidic~~ fluid processing pathway than are the second input opening and the output opening.

2. (Original) The microfluidic device of claim 1, wherein the substrate comprises a first surface and an opposite second surface and each of the first input opening, the second input opening, and the output opening is formed in the first surface of the substrate.

3. (Original) The microfluidic device of claim 1, wherein one or more of the first input opening, the second input opening, and the output opening is sealed with a frangible seal.

4. (Original) The microfluidic device of claim 1, wherein the output opening is closer to the material separation region than is the second input opening.

5. (Original) The microfluidic device of claim 1, wherein the second input opening is closer to the material separation region than is the first input opening.

6. (Original) The microfluidic device of claim 1, further comprising a first material and a second material disposed in the material separation region, wherein the first material has a density that is greater than the density of the second material, and wherein one of the first material and the second material is insoluble in the other.

7. (Original) The microfluidic device of claim 6, wherein the denser first material comprises a plurality of colloidal rod particles.

8. (Original) The microfluidic device of claim 6, wherein the denser first material comprises a plurality of nanoparticles.

9. (Original) The microfluidic device of claim 1, further comprising:

a sample-retainment feature; and

a first valved fluid communication between the sample-retainment feature and the separation chamber.

10. (Original) The microfluidic device of claim 6, further comprising a fluid disposed in the material separation region, and wherein the denser first material is water-insoluble at 25°C,

and the denser first material and the fluid together comprise a suspension, a mixture, an emulsion, or a combination thereof.

11. (Original) The microfluidic device of claim 1, further comprising a liquid disposed in the material separation region.

12. (Original) The microfluidic device of claim 11, wherein the liquid comprises water or an aqueous solution.

13. (Currently Amended) The microfluidic device of claim 1, wherein the ~~material-trapping region~~ separation chamber comprises a U-shaped channel.

14. (Currently Amended) The microfluidic device of claim 1, wherein the substrate includes an axis of rotation, and wherein the ~~material loading~~ pathway end is closer to the axis of rotation than is the separation chamber.

15. (Original) The microfluidic device of claim 1, wherein the substrate includes a rectangular-shaped top surface.

16. (Original) The microfluidic device of claim 1, wherein the substrate is disc-shaped.

17. (Original) The microfluidic device of claim 1, wherein the separation chamber includes nanoparticles disposed therein.

18. (Original) A system comprising:

the microfluidic device of claim 1;

a rotatable platen;

a holder for holding the microfluidic device on or in the rotatable platen; and

a drive unit operatively connected to rotate the rotatable platen.

19. (Original) A system comprising:

the microfluidic device of claim 1;

a holder for holding the microfluidic device; and

an ultrasonic device capable of producing ultrasonic energy and being operatively arranged relative to the holder to direct ultrasonic energy toward the material separation region of the microfluidic device when the microfluidic device is operably held by the holder.

20. (Original) A system comprising:

the microfluidic device of claim 1;

a holder for holding the microfluidic device; and

an electro-magnetic excitation beam source operatively arranged relative to the holder to direct excitation beams toward the material separation region.

21. (Original) The system of claim 20, further comprising an electro-magnetic emission beam detector operatively arranged relative to the holder to detect emission beams emitted from the material separation region.

22. (Original) A system comprising:

the microfluidic device of claim 1; and

a fluid handling arm, the fluid handling arm including a material supply opening and a material evacuation opening, and wherein the material supply opening and the material evacuation opening are capable of simultaneously being aligned with at least one of the first and second input openings and with the output opening, respectively, of the microfluidic device.

23. (Original) The system of claim 22, wherein the fluid handling arm includes an alignment recess to operatively align the fluid handling arm with respect to the microfluidic device.

24.-50. (Canceled)